Claims

1. A pharmaceutical composition comprising
   a) at least one fragment of a polynucleotide;
   b) at least one antigen; and optionally
   c) a pharmaceutically acceptable carrier and/or diluent.

2. The pharmaceutical composition according to claim 1 characterized in that the polynucleotide (a) comprises the sequence of a binding site for transcription factors or a part thereof or the sequence which is complementary to said binding site for transcription factors or a part thereof.

3. A pharmaceutical composition comprising
   (a) a polynucleotide or an oligonucleotide comprising the sequence of a binding site for transcription factors or a part thereof or a polynucleotide or an oligonucleotide comprising a sequence which is complementary to said binding site for transcription factors or a part thereof; and optionally
   (b) a pharmaceutically acceptable carrier and/or diluent.

4. The pharmaceutical composition according to any one of claims 1 to 3 characterized in that the polynucleotide is a DNA oligonucleotide.

5. The pharmaceutical composition according to claim 4 characterized in that the DNA oligonucleotide is single stranded.

6. The pharmaceutical composition according to any one of claims 1-5 characterized in that the polynucleotide comprises 5-40 nucleotides.

7. The pharmaceutical composition according to claim 6 characterized in that the polynucleotide comprises 15-25 nucleotides.

8. The pharmaceutical composition according to any one of claims 1-7 characterized in that the polynucleotide comprises the sequence

5'PuPuCGPyC

or a non-toxic derivative thereof.

9. A pharmaceutical composition according to any one of claims 1 to 9 wherein said binding site is or is derived from a eukaryotic binding site.

10. The pharmaceutical composition according to claim 9 wherein said eukaryotic binding site is a binding site for a cytokine.

11. The pharmaceutical composition according to any one of claims 2 to 10 wherein said part is a motif of a transcription factor binding site or a complementary sequence thereof.

12. The method of any one of claims 2 to 11 wherein said part comprises at least 7 nucleotides.

13. The pharmaceutical composition according to any one of claims 1 to 12 characterized in that the polynucleotide comprises at least one phosphorothioate linkage.

14. The pharmaceutical composition according to any one of the preceding claims 1 to 3, characterized in that it comprises a further adjuvant.

15. The pharmaceutical composition according to any one of claims 1 to 11, characterized in that the antigen (b) is selected from the group comprising peptides, polypeptides, proteins, polysaccharides, steroides and tumor cells.

16. The pharmaceutical composition according to any one of claims 1 to 15, characterized in that the composition is a vaccine.

17. The pharmaceutical composition according to claim 16 characterized in that the vaccine is used for the treatment of cancer.

18. The pharmaceutical composition according to claim 16 characterized in that the vaccine is used for the prophylaxis and/or treatment of pathogen microorganisms.

19. Use of an oligonucleotide or a polynucleotide as defined in any of the preceding claims for the preparation of a pharmaceutical composition for the modulation, enhancement or suppression of an immune response.

20. Use according to claim 19 wherein the modulation, suppression or enhancement is the result of a vaccination.

21. Use according to claim 19 wherein the modulation, suppression or enhancement is selected from the group break of tolerance, regulation of TH1/TH2 helper cell responses, switch of Ig classes, treatment of autoimmune responses and induction of tolerances.

22. Use of an oligonucleotide or a polynucleotide as defined in any of the preceding claims as an immune adjuvant.

23. A method for the identification of a nucleic acid sequence useful as an enhancer, modulator or suppressor of an immune response comprising

(a) testing a nucleic acid molecule comprising a putative binding site of a transcription factor for toxicity;

(b) modifying the nucleic acid sequence of said putative binding site comprised in said nucleic acid molecule which has proven toxic in step (a); and

(c) repeating steps (a) and (b) one ore more times until a non-toxic nucleic acid molecule has been identified.